Newtons First law of Motion

**Vocabulary words:**

**Friction:**The resistance that one surface or object encounters when moving over another.

**Gravity:**The force that attracts a body toward the center of the earth, or toward any other physical body having mass.

**Inertia:**A property of matter by which it continues in its existing state of rest or uniform motion in a straight line, unless that state is changed by an external force

**Tendency**

**Balanced force**

**Unbalance force**

**Push**

**Pull**

**Practical Activity: Inertia – A Body in Motion**

In this experiment you will try to drop a tennis ball on a target as you run past the target. Think it’s easy? Before you begin, try to guess what will happen. Try to figure out when you will need to release the ball in order to hit the target. Write down your predictions in your notebook. Give the reasons why you think you are correct.

As you conduct this experiment, think of the challenges Air Force pilots had before the invention of the guided missiles that are used today. Pilots in World War II had to understand mathematics in order to drop bombs on targets while causing as little harm as possible to surrounding buildings and people. These are the same concepts that you will learn with this experiment.

**Materials**

You will need the following items for this experiment:

• one tennis ball

• clearly-marked target(s), i.e., notebook paper, a chalk mark, or tape

**Procedure**

1. Place a target about 10-15 meters away from a starting line. Mark the starting line with chalk or tape.

2. Hold the tennis ball and do not let your elbow leave your side as you run and drop the ball. Do not throw the ball. You should hold the ball from its sides so that you can release your grip as you let it drop. Remember to drop the ball and not throw it, otherwise you will change the intent of the experiment.

3. Have three students stand alongside (but slightly back from) the running path to act as observers. One should stand before the target, one at the target, and one just after the target. Their objective is to determine exactly where the runner released the ball and where the ball strikes the ground.

4. Ask the runner to sprint toward the target as fast as she or he can and try to drop the ball so that it lands on the target.

5. Next, have the observers make a diagram in their notebook of where the ball was released and where it landed. Repeat the experiment until the ball hits the target.

6. Use the information in Step 5 to predict what would happen if a student ran at a slower speed.

7. Repeat Steps 4-5, using a different runner sprinting at a slower speed.

8. Use the information in the previous trials to predict what would happen at a walking speed.

9. For the last trial, ask a student to walk toward the target. Repeat Steps 4-5.

10. Write a summary of your results in your below. Form conclusions based on the speed of each runner, the location of each ball’s release, and the exact point where each ball landed